

Chapter 10: Equity and Environmental Justice

10.1 Introduction

The decision analysis approach used in this study does not lead to recommendations about resolving equity and environmental justice issues. However, it presents the analysis results in a way that allows examination of these issues and exploration of policies that address them. Most importantly, the results are always disaggregated so that the costs to groups that pay for EMF mitigation can be separated from the benefits accruing to other groups. Regarding the costs of mitigation, the analysis leaves many choices of how to distribute these costs among shareholders, ratepayers, and residents near power lines. These choices provide a powerful mechanism to address equity and environmental justice issues.

It is important to avoid the temptation to look at the “bottom line” of the analyses. The results are broken down by four criteria, which are associated with the costs and benefits accruing to different stakeholders:

1. EMF health effects – residents living near the powerlines
2. Costs – ratepayers, shareholders, or tax payers
3. Outages – all consumers of electricity
4. Property values – owners of properties near powerlines

Each mitigation alternative comes with estimated consequences in terms of EMF health effects, costs, outages, and property values. However, the mitigation alternatives do not specify the mechanism to finance the project cost. Policy makers therefore have significant control over financing mechanisms, if they decide to implement one of the mitigation alternatives. For example, they can decide to incorporate the cost of mitigation into the rate base, to have utilities (and thus their shareholders) pay for this without a rate increase, or to restrict payments to subsets of electricity users.

Each of these alternatives has significant equity and environmental justice implications. For example, when using a strict utilitarian view, undergrounding would be the preferred option in areas with high property value benefits, but it may not be a preferred option in areas with lower property value benefits. Such a result, when applied as a general policy, would clearly lead to inequities. Another example concerns the payment mechanisms for mitigation. When all ratepayers pay for mitigation, they will, in effect, pay restitution to people who have been negatively affected by the possible property value and health impacts of EMF exposure. They will also pay for the possible property values increase of those who bought homes that were devalued due to the EMF issue.

To illustrate how complicated this issue is, consider a homeowner who bought a house near a power line in 1960, well aware of the visual impacts of the line, but unaware of the EMF issue. A mitigation alternative that would lead to undergrounding the line

1 would be appropriate, if EMF poses a health hazard, and it thus would provide a
2 restitution of any loss of value of his house because of EMFs fears. However, it would
3 also provide a “windfall” to the homeowner by eliminating the visual impacts of the
4 powerline, which existed when the home was purchased – presumably at a reduced price.
5 An owner who bought the house cheaply in 1990 during the height of the worries about
6 EMF might receive a windfall in property values for both esthetic and EMF fear reasons,
7 if the line is placed underground.

8
9 It is therefore not simply a matter of counting or not counting property values, it
10 also is a matter of deciding who should pay for undergrounding, and who should benefit
11 from the possible property value benefits of undergrounding. Similarly, if EMFs are not
12 mitigated, and homeowners are successful in extracting restitution for any alleged losses
13 in property values, decisions have to be made about who should receive the restitution
14 (e.g., only homeowners who experienced a demonstrated loss due to EMF issues) and who
15 should pay for it (e.g., shareholders and/or rate payers).

16
17 Environmental justice embraces equity and also addresses other moral and legal
18 issues. The US Environmental Protection Agency defines environmental justice as
19 follows:

20
21 *“Environmental Justice is the fair treatment and meaningful involvement of*
22 *all people regardless of race, color, national origin, or income with respect to the*
23 *development, implementation, and enforcement of environmental laws,*
24 *regulations, and policies. Fair treatment means that no group of people, including*
25 *racial, ethnic or socioeconomic groups should bear a disproportionate share of*
26 *the negative environmental consequences resulting from industrial, municipal, and*
27 *commercial operations or the execution of federal, state, local, and tribal*
28 *programs and policies.”*

29
30 Environmental justice asks for special protection for the most vulnerable, the most
31 susceptible, the poor, and people of color. This is not merely an equity issue but it invokes
32 fundamental moral and ethical principles. The workshop on environmental justice held as
33 part of this project addressed these issue. One of the key policy conclusions from this
34 workshop was that racial and socioeconomic minorities should receive priority when
35 making decisions about protecting health and well-being.

36
37 In the EMF context a major reason for giving racial and socioeconomic minorities
38 this priority is that they often are exposed to higher levels of chemicals and other non-
39 EMF pollutants. If EMF is a cancer promoter, they would be more likely to suffer from
40 EMF exposure than other social groups. Also, the poor and people of color have less
41 resources and access to medical care, so if they do suffer from health effects, either due to
42 EMF or non-EMF sources, they are more likely to have longer effects or die than other
43 social groups.

1 Implementing EMF mitigation alternatives like the ones analyzed in Chapter 8
2 raises profound equity and environmental justice questions, including:

- 3
- 4 1. Is the distribution of EMF risks and electricity benefits fair, or is the risk
- 5 concentrated on a few while the benefits accrue to all electricity users?
- 6 2. Do some social groups (especially poor people and communities of color) carry a
- 7 higher burden of EMF exposure than others?
- 8 3. Should residents whose properties near power lines have depreciated, be
- 9 compensated?
- 10 4. Who benefits from EMF mitigation and who should pay?
- 11 5. In light of the uncertainties surrounding a possible EMF-health link, what should
- 12 be the guiding principles for making decisions (e.g., cost-benefit, prudent
- 13 avoidance, precautionary action)?
- 14 6. How can EMF mitigation decisions be made to provide special protection for the
- 15 most vulnerable, most susceptible, the poor, and people of color?
- 16

17 The first two questions refer to the distribution of risks and benefits and can, to
18 some extent, be answered by analysis. The GIS analysis described in chapter 2, for
19 example, provides some evidence that distributional inequities may be a minor factor. The
20 third and fourth questions involve moral and ethical issues related to responsibility,
21 restitution, and fairness in re-distributing risks, costs, and benefits. The last two questions
22 raise fundamental issues of environmental justice and moral obligations.

23

24 The analytical tools and computer models developed for this project cannot answer
25 these questions. The tools were developed largely from a utilitarian perspective to provide
26 the highest net social benefit. To address the ethical and environmental justice issues, we
27 therefore held a workshop with experts in the fields of environmental justice, ethics, law,
28 economics, and risk assessment. The report of this workshop is included as Appendix D
29 to this report. In this Chapter, we will attempt to combine lessons and insights gained
30 from the analysis and the lessons learned from the workshop to provide policy makers
31 with insights on these issues that go beyond a simple utilitarian view of the EMF issue.

32

33 **10.2 Distribution of EMF Exposures**

34

35 We are surrounded by electricity and EMFs everywhere in our lives. Therefore, if
36 EMF poses a hazard, we are all at risk. However, it is also clear from the exposure models
37 that, when considering the sources of EMFs in the power grid, living near of transmission
38 lines creates the highest levels of exposure, followed by primary distribution lines,
39 followed by secondary distribution lines¹ and net currents from home grounding systems.

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42

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¹ While we did not model exposures from secondary distribution lines directly, the highest levels of these exposures are likely to be experienced at the service drop. The fields created by these lines were included in estimating the field profiles in the home grounding model.

Table 10.1 Typical Exposures from Different Power Grid Sources

Source	Range of Exposures
230 kV Transmission Line	50-60 mG at 50 feet
115 kV Transmission Line	10-25 mG at 50 feet
69 kV Transmission Line	5-15 mG at 50 feet
Primary Distribution Line	3-5 mG at 50 feet
Net Current in Home	2-6 mG

The number of exposed people differs, however, dramatically for these three sources. There are about 2,500 miles of transmission lines (of a total of 43,000 miles) that run through residential areas. In chapter 2 we estimated that about 500,000 people are exposed to elevated fields (above 2 mG) due to transmission lines. We also estimated that about 1,000,000 people have exposures above 2 mG due to distribution lines, and about 1,650,000 people are exposures above 2 mG from home grounding systems.

To determine whether some social groups, especially the poor and communities of color, carry a larger burden of EMF exposure than others, we re-examine the results from the GIS study (Chapter 2, see Table 10.2). These results suggest that there is no over-representation of minority groups or the poor near transmission lines.

Table 10.2 Socio-Demographic Characteristic of People Living Near Transmission Lines and in California (from 1990 Census)

	Within 500 ft of			In all of
	230 kV Line	115 kV Line	69 kV Line	California
Percent Black	3.0%	3.4%	2.3%	7.4%
Percent Hispanic	20%	17.9%	21.6%	25.4%
Household Income	\$39,283	\$35,567	\$34,708	\$36,000

This interpretation has to be qualified by a methodological limitation of the GIS analysis. The census data on which this analysis was based came from the block group level, which typically includes 1,000 people. The area of a block group varies by population density, which can be as low as 2,000 per square mile for suburban areas (e.g., Irvine, California) to 10,000 per square mile (e.g., Long Beach, California) or higher for densely populated urban areas. Thus, at one extreme (2,000 people per square mile), the block group area would be larger than the buffer area used in the GIS analysis (0.5 square miles for the block group vs. 0.18 square mile for the buffer). To apply the census data for these larger areas, one must assume that the distribution of population characteristics is homogenous throughout the block group area. In an extreme inhomogeneous case, it might be possible, for example, for all blacks to live within the 500 foot buffer and none outside.

1 At the other extreme, it is possible that the block group area fits entirely into the
2 500 foot buffer. This would be the case, when the population density exceeds
3 approximately 5,500 per square mile. In this case, the entire block group data would be
4 applicable. In the mixed cases of multiple block groups intersecting the 500 foot buffer
5 area, the census estimates were averages weighted by area within the buffer. Thus a block
6 group that intersected only 5% of the buffer area would get 1/10th of the weight of a block
7 group one that intersected 50% of the buffer area.

8
9 In spite of these caveats, the GIS analysis suggests that Blacks, Hispanics, and the
10 poor are not over-represented in areas near transmission lines. While not conclusive, it
11 would be very difficult to explain such a persistent pattern by an inhomogeneous
12 distribution of the population within block groups.

13
14 Even if the poor and communities of color do not carry any additional burden of
15 EMF exposure, a case can be made that they are at higher risk and thus deserve special
16 protection. There is evidence that these social groups are exposed to higher levels of
17 toxics and other cancer causing agents. If EMF exposure is a cancer promoter, they may
18 therefore be more susceptible to developing cancer due to EMF exposure.

19
20 In summary, the answers to questions 1 and 2 are:

- 21
22 1. While the benefits of electricity are shared by all Californians, a little less than
23 10% of the population carry the burden of potential EMF risks, and less than 2%
24 are exposed to the highest fields from transmission lines.
25 2. There is no evidence that communities of color or poor people are over-
26 represented in areas near transmission lines.
27 3. There is some evidence that people in poor communities and communities of color
28 are exposed to higher cancer causing agents (other than EMF) and thus may be
29 more susceptible to cancer promotion.
30

31 32 **10.3 Property Values**

33
34 Property values are a key equity concern of residents living near power lines.
35 Many homeowners are convinced that their properties have depreciated substantially due
36 to the EMF issue and the resulting reluctance of buyers to purchase a home near
37 powerlines, especially near transmission lines. This depreciation may have occurred
38 regardless of whether EMF poses a real hazard or not, since buyers' preferences are often
39 determined by perceptions and fears rather than facts. Homeowners who have this
40 concern consider the past depreciation as a loss and they want this loss to be explicitly
41 counted in the policy analysis. At the minimum, they would like to see the loss of
42 property values clearly identified as an offset to the cost of mitigation, instead of as a
43 perceived "windfall" for property owners with currently depreciated home values. Some
44 homeowners would prefer this "past loss" framing to encourage restitution by the utilities
45 for past property losses.
46

1 This framing of the property values issue has two modeling consequences:

- 2
- 3 1. For overhead line configurations, the past property value depreciation should be
- 4 counted as a loss, rather than as the status quo;
- 5
- 6 2. For undergrounding powerlines, property appreciation should not be counted as a
- 7 gain for the homeowners, but as restitution that brings the owner back to the status
- 8 quo.
- 9

10 This framing of the problem is in contrast to the utilitarian framing, which looks
11 into the future and considers past losses as “sunk cost.” A major reason for the utilitarian
12 framing is that one should be concerned about the future social net benefit, not about the
13 past. Also, it would be practically impossible to track all past losses, e.g. past fatalities
14 due to pole crashes, fires, and electrocutions and penalize the status quo with these losses.
15 While the utilitarian view is firm on considering the future and not the past, it is neutral on
16 the issue of whether to count future gains in property values, e.g. through undergrounding,
17 as a “gift” to the homeowner or as an act of restitution.

18

19 In the discussion of the Analytica models (Chapter 8), we used the utilitarian frame
20 of the property values concern. However, we want to be clear that this framing allows the
21 consideration of part or all future gains as restitution for past losses. Recognizing the
22 desire of homeowners to frame the past losses as real social losses in the policy analysis,
23 we have provided a user’s option in the “Settings” menu of the Analytica models, which
24 lets users switch the framing of property values. Of course, for all scenarios that involve
25 new construction, property losses to existing homes are always counted as losses.

26

27 To complicate matters even more, one has to distinguish three types of
28 homeowners:

- 29
- 30 1. Homeowners who bought the home before the powerline was built,
- 31 2. Homeowners who bought the home after the powerline was built, but before
- 32 EMF became an issue;
- 33 3. Homeowners who bought the home after the line was built and after EMF
- 34 became an issue.
- 35

36 Homeowners in category 1 experienced both the regular depreciation of the home
37 due to aesthetics, noise, and radio interference and possibly a depreciation due to the EMF
38 concerns. If they were to claim restitution and the CPUC would grant this request, they
39 would receive the full amount of depreciation minus the compensation that they may have
40 already received. For them, undergrounding would be the appropriate form of restitution.
41 They would, however, obtain a small “windfall,” if they had been compensated for the
42 expected depreciation due to aesthetics, noise, and radio interference.

43

44 Homeowners in category 2 bought a depreciated house knowing of the usual
45 powerline impacts. They would have experienced a possible depreciation due to the EMF
46 concerns, but not the full depreciation due to powerlines. If these homeowners claimed

1 restitution and the CPUC would grant their request, they should be compensated only for
2 the possible property depreciation due to EMF concerns. They would obtain a “windfall”
3 when undergrounding leads to an appreciation of the home that exceeds the sum of the
4 depreciations due to regular powerline impacts and EMF.

5
6 Homeowners in category 3 bought a depreciated house knowing the usual
7 powerline impacts and presumably knowing the EMF concerns. It would be unreasonable
8 for them to claim restitution due to the usual powerline impacts, and very difficult to make
9 a case of restitution because of EMF concerns. They would obtain a “windfall” when
10 undergrounding the line leads to appreciation both due to the elimination of the usual
11 powerline impacts and due to EMF.

12
13 There is, of course, the fourth category of former owners of homes near powerlines
14 who sold their homes at depreciated prices. At one time they were in one of the three
15 categories above. Depending on when they sold, they might claim that they sold for less
16 either because of the usual powerline impacts, EMF, or both. They might argue that the
17 “windfalls” obtained by the current owners should be transferred to them.

18
19 Practically, implementing a system of claims and restitution is, of course,
20 extremely difficult, if not impossible. No one knows what portion of the possible
21 depreciation is attributable to EMF and what portion is attributable to non-EMF issues, if
22 any. Our models parameterized these portions, usually splitting the overall depreciation in
23 half. Furthermore, it is extremely hard to track the different categories of homeowners,
24 and even harder to track past homeowners and their categories. About 54% of all
25 homeowners own their homes for less than ten years (www.census.gov). Since the debate
26 about EMF began in the US in 1979, each house has probably experienced one or two
27 changes of ownership. Depending on when one assumes that property depreciations
28 occurred (around 1980 after the publication of the Wertheimer and Leeper paper or at the
29 height of the research activity in 1990), between 50% and 75% of all homeowners living
30 near power lines bought their homes at depreciated prices.

31
32 Furthermore, any system of claims and restitution would have to be based on
33 scientifically sound estimates of property values appreciations or depreciations, due to
34 both EMF and non-EMF impacts. While our analyses indicate that property value impacts
35 in the 10-20% change can matter for the final decision, it does not answer how much
36 impact exists. The project did include a feasibility study to determine the opportunities,
37 limitations, and costs of such a property values study. To perform this feasibility study,
38 we requested two study proposals, one by a respected real estate appraisal firm in
39 Southern California and one by a resource economist familiar with the EMF issue and
40 property value studies (see Appendix E). The real estate appraisers proposed a fairly
41 simple appraisal methodology that had methodological weaknesses and was unlikely to
42 disentangle EMF and non-EMF effects. This study, estimated at about \$279,000 would
43 not be able to answer to the property values questions raised above. The resource
44 economist proposed a much more elaborate study design for \$800,000. But even he
45 admits that there are many limitations that make it difficult to disentangle EMF and non-
46 EMF effects.

1
2 In summary, the answer to question 3 (should residents whose properties near
3 power lines have depreciated, be compensated?) is not at all straightforward. It depends
4 on a sound and scientific determination of the amount of depreciation due to both EMF
5 and non-EMF effects and on tracking the tenure of the homeowners with respect to the
6 time periods during which depreciation may have occurred.

7 8 **10.3 Who Benefits from EMF Mitigation and Who Should Pay?**

9
10 Many of the EMF mitigation measures are fairly inexpensive and effective in
11 reducing exposure – e.g., split phasing, compact delta, and optimal phasing. These costs
12 could conceivably be absorbed by the ratepayers, since, in real terms, they would amount
13 to a very slight rate increase (see Chapter 11). In contrast the cost of undergrounding
14 substantial and would require a significant rate increase, if financed over a reasonably
15 short period of time (e.g., ten to twenty years).

16
17 There are four sources of possible payments for EMF mitigation: Ratepayers,
18 shareholders (in case of investor owned utilities), taxpayers (in case of municipal utilities),
19 and beneficiaries of EMF mitigation. Shareholders would pay by reduced profits, if the
20 cost of mitigation is not passed through to the ratepayers. This could be a large proportion
21 of shareholders' income.

22
23 According to a basic principle of environmental justice, the “polluter” should pay.
24 Utilities will not accept the “polluter” role, unless there is convincing evidence that EMF
25 exposure poses a hazard. In that case, utilities will transfer the payment to either
26 ratepayers, shareholders, or tax payers, and most likely to a mix of them. The main
27 problem with applying this principle is, of course, the uncertain state of EMF research.

28
29 The beneficiaries of EMF mitigation are those currently exposed to a potential
30 health risk and, in the case of undergrounding, those who benefit from property values
31 appreciation and improved quality of life. Cheap, relatively cost-effective solutions
32 primarily benefit those with health risks. Undergrounding benefits both groups.

33
34 If EMF exposure poses a health hazard, it would be fair that utilities (and, by
35 implication, ratepayers, shareholders, and taxpayers) pay to reduce the risks to relatively
36 few in order to provide the electricity benefits to many who are not affected by EMFs.

37
38 It is much more difficult to judge the benefits of home value appreciation to
39 property owners. If it is true that a large percentage of homeowners have bought their
40 houses after the EMF debate began (and thus benefited from presumably lower prices), the
41 appreciation benefits of undergrounding becomes a “windfall” to most of these
42 homeowners. Since it is impractical to transfer that windfall to the previous homeowners
43 who sold at depreciated values, this windfall is real and could be judged to be unfair. A
44 possible solution is to obtain co-payment for undergrounding from the homeowners who
45 are likely to experience this benefit. Consider undergrounding a distribution line, for
46 example. Most homeowners would agree that the aesthetic and property values

1 implications of undergrounding are worth some payment. If undergrounding a one-mile
2 stretch of distribution lines cost \$1 million, and if 100 homes participate, the costs per
3 home are \$10,000, which may well be offset by the property values benefits².

4
5 In summary, the answer to the fourth question (who benefits from EMF mitigation
6 and who should pay?), like the answer to the third one is complex. Beneficiaries are those
7 with reduced health risks, and those who benefit from property values appreciation (in
8 case of undergrounding). It might be considered fair that all beneficiaries of electricity
9 production (ratepayers, shareholders, and taxpayers) should pay for EMF mitigation to
10 reduce health risks, if EMF is shown to be a hazard. There probably would be less
11 consensus on the fairness of payment plans for undergrounding in regard
12 to property values costs and benefits.. Solutions that involve a mix of payments by
13 ratepayers, shareholders, and taxpayers, and property owners may be considered the most
14 fair in this case.

15 16 **10.4 Environmental Justice**

17
18 Up to this point we have discussed distributional and equity issues related to EMF
19 mitigation. As stated in the introduction, environmental justice principles embrace but
20 also go beyond these distributional issues. Following is a summary of the major
21 conclusions of the workshop on ethical and environmental justice considerations in EMF
22 policy. We should point out that not all conclusions of the workshop participants are
23 shared by all participants of the workshop or by all authors of this report. However,
24 decision-makers in Public Utilities Commissions and in city councils should expect
25 stakeholders with an environmental justice perspective to espouse the views and
26 prescriptions summarized below. To make clear that these views and prescriptions are
27 those by environmental justice advocates and not necessarily by the authors, we put them
28 into italics.

29
30 *The ethical imperatives implied in the definition of Environmental Justice should be*
31 *embedded even in technical choices such as that of the metric for comparing different options,*
32 *of the treatment of the uncertainty, and choice of control options. Inequity may result from*
33 *the differential context and background exposures of the communities affected, and from the*
34 *processes of making and communicating the decisions on control or prevention of exposure.*
35 *Environmental Justice demands are interested in actions that are pragmatic and results-*
36 *oriented rather than in exploring the philosophical structure, or hypothetical or actual cases*
37 *in which their prescription would lead to unacceptable results of compounded exposure.*
38
39

² One of the authors of this report (von Winterfeldt) helped to form an assessment district to finance the undergrounding of half a mile of a primary distribution line, which obstructed some views and was considered unsightly by most neighbors. The total cost of \$300,000 was shared by about 20 homeowners at a cost of \$15,000 each. The costs were financed by a special city bond with annual payments of about \$1,500 for fifteen years. The home values in the neighborhood were about \$400,000 at the time, and von Winterfeldt's home value was estimated to increase by at least 5%, or \$20,000. Like von Winterfeldt, most homeowners considered this to be a good deal, since there was not only an increase in home value but also an improvement in the quality of life.

1) *Environmental Justice applies principles of equity to all populations.*

Both the tort law and the criminal law seek to protect not just those whose injuries are “reasonably foreseeable” or those that are “intended,” not just the upper 95% of the population but also the most vulnerable, most susceptible, and even those with very rare vulnerabilities. Thus the tort law seeks to correct unjust invasions of others’ interests, and the criminal law punishes invasion of those interests. Environmental health administrative law seeks to prevent some of those invasions from occurring in the first place, for example, to prevent EMFs from invading people’s interests.

The ethical principle for environmental protection emerges in analogy with the above principles: if the healthy are entitled to preventive measures to protect them from invasion of their interests, others who might be more susceptible to disease have equal standing to be similarly protected. This requires equal protection on an exposure-by-exposure basis, with equal standing for the healthy and the susceptible for protection from cumulative exposures.

A strong part of the EJ perspective is to accord a special moral and legal status to communities of color because of a history of social, economic and environmental discrimination. Title 6 of the Civil Rights Act gives a special legal status to such communities and protects them from adding new environmental hazards or potential hazards to their already disproportionate burden. Socially disadvantaged communities and communities of color may be especially susceptible to added potential hazards because of the above history. This is a further argument against adding EMF or other environmental exposures to their already full plate of potential hazards. This could apply to new EMF facilities even if the communities do not have a proven excess exposure to EMF. The special moral, legal and biological status of communities of color means that one should take preventive action with a lower degree of scientific certainty of a hazard

2) *Principles of due care need to be enunciated and followed.*

Following legal analysis of the issues, due care could be defined as economically and technically feasible precautionary actions, based on what is known and knowable about the methods of minimizing public exposure and the methods of preventing disproportionate cumulative exposure of any minority group or other population sector. This could include: warnings and self-protective instructions for persons exposed; diligent research and EMF monitoring efforts; and, routing of new power lines and use of protective engineering and design options; reengineering and rerouting existing power lines; and, collaborative efforts with manufacturers of products which cause EMF exposure in residences and workplaces, and with regulators of such products (e.g. Consumer Product Safety Commission, Occupational Safety and Health Administration), in order to foster new product designs and use instruction which lessen EMF exposure.

With regard to remediating existing EMF power grid exposures, due care means that poor communities and communities of color should either be placed first in line, or should have an equal chance at being first in line with other communities.

1
2 *Finally, procedural and economic aspects of implementing such amplified "prudent*
3 *avoidance" policies would need to be addressed by requiring, for example, that*
4

- 5 • *utility project planning and state agency decision-making be transparent, exclude*
6 *discriminatory values and assumptions, and prevent disproportionate cumulative*
7 *exposure of any minority or other population sector; and that*
8
- 9 • *public hearings be held and viewpoints of affected persons be addressed, in*
10 *determining prudent avoidance expenditures, utility cost recovery, and the*
11 *allocation of the costs to be recovered among utility customers.*
12

13 *Building such an amplified policy of "prudent avoidance" and diligently implementing*
14 *it cannot be done on an ad hoc or piecework basis. State regulators will need to take a holistic*
15 *approach to the challenge of addressing EMF health risk and environmental justice concerns*
16 *in order to meet their societal responsibilities.*
17

18 *3) Methods of analysis, the data used, and decision making have to be appropriate.*
19

20 *EJ principles have to be part of the methodology and plan of mitigation. The data*
21 *used need to have the necessary disaggregation and detail. EJ advocates are not*
22 *sympathetic to guiding action through a hierarchy of general principles. In the case of*
23 *EMFs with a high degree of scientific uncertainty of hazard, EJ considerations would lead*
24 *to a precautionary principle, which prevents the additional exposure. Probabilistic*
25 *analysis may be a valuable technical exercise, but it is irrelevant and peculiar to*
26 *stakeholders whose primary concern is environmental justice.*
27

28 *Any analysis should consider the equity of impacts. In case of disparate impacts due*
29 *to placement of facilities, or at-risk, vulnerable populations, mitigation efforts should address*
30 *these explicitly. A monitoring, mitigation, and evaluation plan should be established, and*
31 *there needs to be periodic feedback on impacts. There should be plans for addressing should*
32 *unforeseen gaps arise in analysis, data or mitigation strategy.*
33

34 *The questions for powerlines need to proceed from a pollution prevention*
35 *philosophy taking precedence over a mitigation philosophy, especially for new siting. As*
36 *deregulation of electric power generation and distribution progresses, this becomes*
37 *increasingly important as a market approach does not take consideration of the differential*
38 *background exposure that people are already subjected to, or consider any factors of equity*
39 *and justice with respect to the distribution of risks and benefits.*
40

41 *Instead of relying purely on quantitative methods, a semi-qualitative method that*
42 *considers all information and places the burden of proof on the facility siting agent rather*
43 *than the community should be considered. In any method, the diversity of the population*
44 *exposed with respect to background data is a serious consideration. Any cost-benefit*
45 *analysis should include all benefits (property values, secondary social values). While the*
46 *health effect data on EMF is uncertain, much of the evidence points to the fact that if EMF*

1 *is harmful, it may be a co-promoter of effects such as cancer. This is particularly*
2 *important in environmental justice considerations because the populations under*
3 *discussion are already exposed to other agents that maybe initiators of the diseases.*
4

5 *This puts a special obligation on the analysts and decision makers to do any*
6 *cost/benefit or risk/ benefit analysis with clear consideration of the background exposures.*
7 *Socio-psychological factors such as the indirect effect of reduced property values on social*
8 *esteem of the community and risk perception should be considered. As our understanding*
9 *of the whole picture of exposure and effects of EMF is still emerging, it is possible and just*
10 *to design into studies an examination of factors such as populations at risk, genetic*
11 *predisposition, synergies with other common environmental agents including*
12 *socioeconomic factors as well as the spectrum of possible health endpoints. In light of EJ*
13 *principles, risk assessment would consider the possibility of special vulnerability of poor*
14 *people and communities of color. In calculating population burden, these communities*
15 *should be considered separately because of their total exposure history and their risk*
16 *reduction should afford them a special priority.*
17

18 *4) Policy and economic analysis needs to account for inequitable exposure history.*
19

20 *EJ policy analysis should require data on unusual impacts of EMF on communities*
21 *of color and associations between EMF and other hazards. People without the necessary*
22 *resources will not have the necessary hazard information, and the market mechanisms will*
23 *not work to protect them from inequitable exposure. Government should provide*
24 *restitution to people of disadvantaged communities and communities of color by affording*
25 *them special protection. The traditional economic vision of scarce resources allocated to*
26 *status quo solutions, instead of considering pollution prevention, increases the likelihood*
27 *of dumping toxic materials inexpensively in poor communities or communities of color.*
28 *This means that in unavoidable situations such as siting an undesirable facility (even of*
29 *uncertain hazard), the government cannot force a random allocation site or let purely*
30 *market forces operate.*
31

32 *EJ principles would also differ from the economists' view that monetary*
33 *compensation can substitute for EMFs mitigation and alternate risk reduction strategies.*
34 *"Polluter pays," is still the appropriate principle, but this "payment" has to be in terms*
35 *of mitigation and prevention of exposure. Payment to prevent exposure is a potential EJ*
36 *issue. The business community will probably oppose rate hikes to cover undergrounding.*
37 *While it is fair that they should share in these costs, if they are exempted it would be*
38 *politically viable to have a residential rate hike to cover undergrounding. This means that*
39 *all stakeholders including business organizations need to participate in the decisions on*
40 *mitigation strategies.*
41

42 *5) Special attention needs to be paid to clear communication and access to information*
43 *and decision making.*
44

45 *Considerations of the autonomy in decision making of communities are also*
46 *central to ensure environmental justice. Stakeholders have to be included in the design and*

1 *implementation of the plan as well as in developing appropriate, culturally sensitive*
2 *communication and outreach. The entire process should be open and accessible to all*
3 *stakeholders. This includes complete, honest, clear and open communication of the facts*
4 *including the unknowns, the values and assumptions embedded in the choice of methods for*
5 *risk assessment, needs assessment and planning of siting, as well as details of the technical*
6 *design and analysis parts of the project. Any message for communication should include*
7 *stakeholders in its development, not just as recipients.*

8
9 *6) Equity and Environmental Justice are not synonymous.*

10
11 *There is a qualitative difference between that minority of EMF exposed people in*
12 *communities of color and the minority of EMF exposed people in affluent communities. The*
13 *former are exposed to EMF in the context of a history of discrimination, which all main*
14 *ethical systems decry.*

15
16 *The minority of EMF exposed people in affluent communities are recipients of*
17 *inequitable EMF exposure while others get only benefit from electricity. Some mainstream*
18 *libertarian ethical systems think that they should fend for themselves. Other mainstream*
19 *liberal ethical systems think that they have a moral claim on the majority for equal*
20 *protection. EJ would support equal protection for these people but sees their claim and*
21 *their situation as less serious than the moral claim and plight of the EMF exposed in*
22 *disadvantaged communities and communities of color. Considering the impact of EMF on*
23 *property values as benefit or restitution or restoration is an issue for property owners in*
24 *more affluent neighborhoods. It is not salient within the EJ framework.*